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PATENT

Case 876P086

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	Examiner: Helen Pratt
James H. Keithly Thomas Taggart	Group Art Unit: 1761
JUICES INCORPORATING MID-SEASON ORANGE CULTIVAR JUICE	
Serial No. 09/583,334	
Filed: May 31, 2000	

DECLARATION OF THOMAS TAGGART

Commissioner for Patents
Washington, D.C. 20231

Sir:

I, Thomas Taggart, do hereby declare as follows:

1. I am a citizen of the U.S.A., I am employed as an Agricultural Scientist, of the company which is the proprietor of the above-captioned application, and my employment with this company began in May, 1996.

2. I hold a B.S. degree in Biology, with emphasis in Botany (1990) from California State University at Sonoma located in Cotati, California.

3. I am a co-inventor of the above-captioned application, and I have obtained extensive experience in food,

beverage and agricultural products and in processes and methods related to such products, both prior to and during my employment with the proprietor of the above-captioned application, such prior employment including my previous experience as a Government Agricultural Biologist cooperating with the California Department of Food and Agriculture and with the U.S. Department of Agriculture.

4. I have been informed that claims of the above-captioned application have been rejected as being unpatentable over Bonaventura et al "Refrigeration of Blood Oranges Destined for Transformation" in view of *Citrus Industry*, June 99, and Pao et al, "Formulation of Sensory Evaluation of Fresh-Squeezed, Unpasteurized Juice Blends"; I am aware of certain tests conducted in my department of the proprietor of this application discussed herein; and I am aware that this Declaration and these tests are offered in support of the patentability of the thus rejected claims.

5. Two basic sets of tests referred to in paragraph 4 were conducted on seven different round orange cultivar juices. One set of tests collected color and chemical data. The other set of tests give gas chromatograph profiles of the pasteurized juices.

6. The color and chemical data gave color values, chemical properties of Brix, acid percent, and Brix-to-acid ratio.

Scott oil percent and Vitamin C content of juices obtained from the seven orange cultivars. The attached Exhibit A summarizes these data and identifies the seven cultivars, one of which is a blood orange, namely Budd Blood. I observe that the Bonaventura reference reports on data obtained from unpasteurized blood orange juice.

7. Based upon my experience noted hereinabove, the data of Exhibit A indicate that the blood orange cultivar could be a valuable cultivar for at least the following reasons. Its color value of 38.5 is very exceptional and would strongly indicate that this blood orange cultivar has substantial promise as a cultivar for use in supplying juice. Also promising in this regard are the Brix level. While the acid percentage was somewhat high, and the resulting BAR was somewhat low, the BAR value nevertheless satisfies desired BAR values for juice from a round orange cultivar. The Vitamin C content and Scott oil percentage are acceptable.

8. Summarizing the data of Exhibit A, my overall impression is that the blood cultivar, on balance, compared favorably with the other six cultivars, including the Hamlin cultivar, which has long been used in commercial production of pasteurized orange juice products in this country.

9. Exhibit B summarizes the gas chromatograph profiles of these same cultivar juices, each juice having been

pasturized for one second at 190°C. In my experience, the most important components of the profile in assessing the potential suitability for a round orange cultivar for commercial production are the values for acetaldehyde and limonin, which are two compounds recognized for having a negative impact on flavor when present at high levels.

10. The acetaldehyde value for the blood orange juice as reported on Exhibit B is at least twice as great as that of any of the other cultivars. This strongly indicates that a pasteurized blood orange cultivar is not acceptable for use in commercial orange juice. Clearly same is not acceptable according to the standards of the proprietor of this application. I make a similar observation concerning the limonin concentration which is significantly higher for the pasturized blood orange juice than four of the remaining six orange cultivar juices.

11. In addition, I participated in informal sensory or taste testing of blood orange cultivars grown in Florida which were of the Tarocco, Aziza and Vainiglia varieties. This testing of the freshly cut fruit and juice of these blood orange varieties was favorable. However, when each juice was pasteurized, pronounced off-flavors were present. In general, after pasteurization, these blood orange juices tasted soapy and bitter.

12. Bonaventura explicitly teaches that the blood orange information of that article is with respect to juices which are "neither pasturized nor frozen, but simply refrigerated." This Bonaventura publication should not be read to teach that blood oranges, when pasturized as required for commercial production, would be satisfactory for use in commercial orange juice production. This is illustrated by comparing Exhibit A hereto and information reported in paragraph 11 hereof (indicating that different varieties of blood orange juice could be suitable for commercial production) with Exhibit B and the paragraph 11 information (indicating that these blood orange juices would not be suitable for commercial production and pasteurization).

13. Pasteurization is an essential and required component of commercial production of orange juice. Of necessity, commercially packaged and distributed orange juice must have reduced microbial activity in order to remain viable for the length of time needed for processing, packaging, transportation and shelf storage, even if always under refrigerated conditions. This is illustrated by Exhibit C, a discussion of orange juice pasteurization from Kimball, *Citrus Processing*.

14. From the above, it is my professional conclusion that the data and information referenced in this Declaration show that the suggestion in Bonaventura that blood orange juices may be useful in unpasteurized juice products does not lead to a

conclusion that the juice properties reported in Bonaventura would be maintained if one were to go against an explicit teaching of Bonaventura, namely pasteurize the juice as required in commercial juice production.

15. I hereby declare that all statements made herein and of my knowledge are true and that all statements made on information and belief are believed to be true; and I further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued therefrom.

Dated: November 1, 2001

Thomas Taggart

EXHIBIT A

UF-IFAS/LEE SWEET ORANGE VARIETY TRIALS, St. CLOUD, OSCEOLA COUNTY, FLORIDA

Variety	Total Sample Wt.	Juice Yield %	Brix	Acid	BAR	Color	Scott Oil	Vit C
Hamlin (USA)	99.3 lbs	59.6	10.4	0.72	14.4	32.8	0.013	51.9
Westin (ARG)	108.1 lbs	62.2	10.9	0.80	13.6	35.0	0.019	45.9
# 8 (BRZ)	96.7 lbs	59.8	10.5	0.62	16.9	35.6	0.070	45.8
Ruby Nucellar (BRZ)	99.4 lbs	59.8	9.9	0.60	16.5	35.0	0.055	36.7
Salustiana (BRZ)	96.6 lbs	60.6	10.3	0.61	16.9	32.3	0.054	48.3
Budd Blood (USA)*	ND	ND	9.6	0.90	10.7	38.5	0.034	46.8
Ambersweet (USA)**	38.2 lbs	52.0	9.4	0.60	15.7	36.5	0.020	21.4

Fruit Extraction: FMC 091 State extractor, fruits extracted For each variety, fruits (total sample wt.) were extracted to produce a single juice sample for laboratory analysis.
Finisher: None
Pasteurization: 190C, 1 sec
Brix = Brix^{o} (corr)
Acid = %, (w/w)
Color = CN, MacBeth ColorEye Spectrophometer
Scott Oil = % (w/w)
Vitamin C = mg Vit C/100 ml juice, (in house method; after J. B. Redd, et al., 1986, Intercit Inc.)
*Fruits harvested Sample size too small for yield determination. ND=not determined.
**UF/IFAS Ambersweet Trials, Winter Garden FL. Fruits harvested . Trees planted

EXHIBIT B

NEW CITRUS VARIETIES

G.C. PROFILE

TROP ID #	55675	55676	55677	55678	55679	55710	55748
ACETALDEHYDE	0.321	0.403	0.616	0.536	0.520	0.296	1.258
ETHANOL	1.500	3.875	5.900	5.485	6.286	0.514	5.310
ACETONE	0.078	0.082	0.115	0.123	0.110	0.108	0.084
ETHYL ACETATE	0.070	0.081	0.091	0.142	0.133	0.254	0.147
HEXANAL	0.354	0.183	0.787	0.695	0.811	0.352	0.180
ETHYL BUTYRATE	0.224	0.134	0.221	0.251	0.331	0.000	0.147
ALPHA PINENE	0.435	0.682	1.575	2.091	2.781	0.821	1.056
OCTANAL/MYRCENE	1.612	3.078	6.563	8.143	11.328	2.626	4.072
LIMONENE	83	99	239	299	398	110	148
DELTA 3 CARENE	0.000	0.055	0.065	0.085	0.080	0.053	0.000
GAMMA TERPINENE	0.088	0.126	0.178	0.204	0.198	0.000	0.115
LINALOOL	0.183	0.698	2.868	3.985	2.731	0.315	1.976
TERPINENOL-4	0.298	0.567	0.814	0.948	0.863	0.141	0.619
ALPHA TERPINEOL	0.050	0.171	0.296	0.348	0.436	0.000	0.195
DECANAL	0.000	0.384	0.535	0.810	0.832	0.000	0.219
NERAL/CARVONE	0.000	0.060	0.277	0.287	0.409	0.000	0.080
BETA CARYOPHYLENE	0.000	0.000	0.039	0.059	0.062	0.043	0.165
CUBEBENE	0.000	0.000	0.045	0.058	0.088	0.000	0.000
VALENCENE	0.968	0.788	2.107	3.373	3.297	2.885	0.906
SELINA 3,6(1,1)DIENE	0.112	0.093	0.288	0.410	0.458	0.325	0.167
NOOTKATONE	0.079	0.000	0.225	0.343	0.392	0.337	0.104
LIMONIN (PPM)	1.1	1.0	1.0	1.2	1.7	1.8	1.8

SAMPLE IDENTIFICATIONS

055675= HAMLIN (11-15-95)
055676= WESTIN (11-15-95)
055677= #6 (11-15-95)
055678= RUBY NUCELLAR (11-15-95)
055679= SALUSTIANA (11-15-95)
055710= AMBERSWEET (11-14-95)
055748= BUDD BLOOD (11-30-95)

EXHIBIT C

Citrus Processing

Quality Control and Technology

Dan A. Kimball

lation. Chlorine levels are easily determined by using locally available swimming pool test kits, which involve the yellow color development of chlorine with o-tolidine. Dilution of [illegible] within the chlorine concentration range on the color comparison chart included with such a kit. Fruit grading, washing, and the use of chlorinated water is generally more important in warmer humid climates or seasons. It should be remembered that fruit that has undergone spoilage prior to chlorinated washings may still impart off flavors and odors to the resultant juice.

Pasteurization

Heat treatment is the most common method of reducing microbial activity in foods. Bacteria, the fastest-growing microorganisms in freshly extracted citrus juices, undergo cell division about once very 30 minutes, depending on the temperature and growing conditions. This means that in 6 hours over 4000 microbes can be produced from one bacterium. Unpasteurized juice can easily contain thousands or tens of thousands of bacteria per milliliter, which can result in significant spoilage if the juice is held for several hours without pasteurization. Pasteurization temperatures as low as 65.6°C (150°F) have been shown to be adequate in the control of microbial growth (Berry and Veldhuis 1977). However, temperatures of at least 91°C (195°F) are required to deactivate pectinase enzymes, which can cause cloud loss and/or gelation. Pasteurization time can be as long as 40 seconds, but modern evaporators elevate juice temperature to pasteurization levels for only about 10 to 15 seconds. Aseptic systems sterilize the juice with similar pasteurizers, and use hydrogen peroxide to sterilize juice containers prior to filling. Aseptic packaging for citrus juices is not as popular as with other juices because of the higher amino acid content of citrus juices, which results in the development of browning and off flavors. The main objective of aseptic packaging is to minimize or eliminate the need for refrigeration. Even though aseptically treated juices have no microbial activity, refrigeration still is required for citrus juices in order to prevent the development of off flavors and colors from the oxidation of amino acids, ascorbic acid, and sugars.

Cooling Effects

Immediate chilling of pasteurized juices or concentrates not only inhibits the growth of surviving microbes, but reduces the rate of oxidative reactions as well. Single-strength juices should be kept close to 0°C (32°F), and concentrates should be packaged and stored at −4°C (25°F) or lower. Concentrations stored at these temperatures consistently show a reduction of microbial flora with time. Concentrates with plate counts in the tens of thousands can experi-